IN THE SPECIFICATION:

Please amend the paragraph beginning on page 1, line 4 as follows:

--The present patent application is related to, and claims priority from, U.S. provisional patent application Serial No. 60/129,989 filed April 12, 1999, for THREE-DIMENSIONAL OPTICAL MEMORY IN FLUORESCENT DYE-DOPED PHOTOPOLYMER to the selfsame inventors as is the present application. The present application is related to U.S. patent application Serial No. 09/547,396, now U.S. Patent No. 6,501,571 filed on an even date for THREE-DIMENSIONAL HOLOGRAPHIC STAMPING OF MULTI-LAYER BIT-ORIENTED NON-LINEAR OPTICAL MEDIA, also to the same inventors. The content of the related patent application is incorporated herein by reference.--

Please amend the paragraph beginning on page 11, line 25 as follows:

--Figure 4, consisting of Figures 4~~a~~4A through 4~~c~~4D, are pictorial images of the edges of exposed regions and accompanying horizontal profiles where in all cases the left half of the image has first been exposed: Figure 4~~a~~4A showing edge enhancement observed 30 seconds after exposure as dye begins to diffuse into the exposed region; Figure 4~~b~~4B five minutes after exposure the profile resembles a flat top while the dip in intensity

corresponding to the dye-depleted region is gone; and with Figures ~~4c~~4C and ~~4d~~4D showing exposures that have been immediately followed by a uniform fixing exposure so that thirty seconds after the exposure of Figure ~~4c~~4C the edge enhanced structure is again apparent, however 5 minutes after exposure of Figure ~~4d~~4D the structure has not changed.--

Please amend the paragraph beginning on page 12, line 19 as follows:

--Figure 8 is a graph showing fluorescence contrast ratio of images recorded for varying exposure energies at three different constant intensity levels.--

Please amend the paragraph beginning on page 17, line 25 as follows:

--The diffusion process of the dye during recording can be observed by exposing a large region in the material. ~~Figure 4 shows~~ Figures 4A-4D show four images in which the left half of the sample has been exposed to light. Immediately after exposure an edge enhancement of the boundary between the exposed and unexposed regions may be observed as dye diffuses into the exposed region (see Fig. ~~4(a)~~4A). Dye concentration builds up most quickly closest to the edges leaving a dye-depleted region immediately outside the exposed area. Over a period of minutes the entire exposed region will slowly rise to a uniform fluorescence level (see Fig. 4 ~~(b)~~4B). The edge enhanced recording observed in

~~(a)~~4A can be fixed, however, by immediately applying a second exposure that uniformly illuminates the entire image and bonds all of the dye in the sample. Figures 4~~(c)~~4C and ~~(d)~~4D show a fixed image immediately after the second exposure and also 5 minutes later. It can be seen that the characteristic edge enhanced structure is still evident even several minutes after the exposure.--

Please amend the paragraph beginning on page 19, line 2 as follows:

--~~*A. Modeling*~~3.1 Modeling--

Please amend the paragraph beginning on page 19, line 3 as follows:

--In order for any particular media to be viable as a three-dimensional optical media it must be possible to selectively record layers within the volume without adversely affecting the information stored at other layers. This material exhibits an intensity threshold in its recording curve which results from the presence of the inhibitor oxygen. Oxygen is dissolved in the mixture because the samples have been prepared in air. In most cases, the presence of oxygen in photopolymers exhibits itself as an exposure time threshold,~~[5]~~ however in this material an intensity threshold may also be observed due to the material's high diffusion rate. The existence of this intensity threshold is independent of the presence

of the fluorescent dye and can be demonstrated through a simple model of the polymerization process of a photopolymer.--

Please amend the paragraph beginning on page 19, line 13 as follows:

--The processes that will be considered in this model are: free radical generation by light, chain initiation (the creation of a radical site on a monomer or polymer), chain propagation (the addition of monomers to a polymer chain), chain termination (the neutralization of a polymer radical site), radical annihilation (the neutralization of free radicals with each other), inhibition (the neutralization of radicals by oxygen), and diffusion.[16,17] We wish to write down the rate equations for the following components of the photopolymer: the monomer (M), the polymer (P), the inhibitor (H), the free-radical initiators ($R\bullet$), the radical sites on the polymer chain ($P\bullet$), and the neutral components such as the solvent or binder (N). For some arbitrary input light intensity $I(x,y,z,t)$ the rate equations are given as:--

Please amend the paragraph beginning on page 20, line 15 as follows:

--Polymer and radical sites on the polymer are assumed not to diffuse. The remaining components must inter-diffuse as a multi-component system. In order to simplify this problem we may observe that the concentration of free-radicals and inhibitors is much smaller than that of monomers, polymers, and neutral components and therefore may be approximated to diffuse freely. We are left then with the diffusion in a bi-component system (between monomers and neutral components) which – if we assume the densities of these components are similar – may be approximated as shown in Eqn. 3 subject to the conservation of mass equation:~~16~~

Please amend the paragraph beginning on page 26, line 6 as follows:

--The process of photopolymerization has been ~~extensive~~ extensively studied, so the reader is referred to other sources for a more exhaustive review. There are in general two types of photopolymerization, free radical and ionic, the difference between the two ~~is~~being that in the latter the photon excites an electron on the monomer directly to a π-electronic state, rather than by a photoinitiator intermediary. This usually requires UV wavelengths, whereupon the molecule de-excites into a radical state, becoming a radical

monomer. However, most polymers are highly absorptive in the UV, thus for using materials with a mixture of properties or for creating structures that depend upon the intensity profile, this sort of addition polymerization is not appropriate. ~~This dissertation relies~~ Thus embodiments rely upon free radical polymerization to create structures in photopolymer~~, the primary steps of which are detailed in Figure 5, consisting of Figures 5a through 5f~~.--